

Versioning

Natural can keep previous versions of the following object types after they have been edited and saved (SAVE command) or stowed (STOW command, for Natural programs):

- Natural members (but not for maps and data areas)
- PDS members
- VSE/ESA members
- CA-LIBRARIAN members
- LMS elements

Note:

This section describes versioning of Natural, OS/390 and VSE/ESA objects only. Versioning of LMS elements is described in the subsection LMS Library Elements in Section BS2000/OSD Objects. Versioning for CA-LIBRARIAN members is described in the subsection Previous Versions in Section CA-LIBRARIAN Members.

For a previous version of an object to be available, versioning must be enabled, or one of the following conditions must be true:

- The member must already have previous versions, or
- The library is specified in the **versioned library** list maintained by the system administrator.

Versioning is enabled at the user level in the user defaults using the PROFILE option on the Natural Main Menu, and/or can be activated or deactivated for the session using the VERSIONS ON/OFF command.

How many versions of a member are to be stored is specified by the system administrator in the NSPF Parameters by selecting the CONFIG option from the Administrator Menu and the NSPF option from the Configuration Menu. This value can be overridden for a member from the Information screen for the member. The system administrator also specifies the database number and file number where versions are kept.

Notes:

1. If the maximum number of versions is reached, a subsequent SAVE or STOW command automatically deletes the oldest version not on HOLD (see the HOLD command below);
2. If you rename a member, all versions are renamed;
3. If you replace a member using the COPY command, all previous versions are deleted.
4. The command 'versions on/off' will affect only members that have not yet been versioned. If 'VERSIONS OFF' is issued, a member with existing versions will be still versioned unless all versions of the member are deleted.

Retrieving Previous Versions

Previous versions are separate object types that can be addressed using the following object type notations in function commands:

NV:	Natural object versions
PV:	PDS object versions
VV	VSE/ESA member versions
MV:	all object versions

You can retrieve previous versions of a member in any of the following ways:

1. If you have administrator status, using the VERSIONS option on the Administrator Menu (this option is described in the **Natural Installation and Administration Documentation**).
2. From the object's Entry Panel, issue the LIST command with the library and member names specified. This generates a list of versions for the member.

Note:

You must explicitly enter the LIST command; if you leave the command line blank, the command defaults to EDIT, and an edit session with the last version is started.

3. From any system screen using the LIST or BROWSE function command in any of the following formats:

```
LIST N/P/LIB/LMS LIBRARY(MEMBER)
LIST MEM LIBRARY.SUBLIBRARY(MEMBER.MEMBER-TYPE) /* for VSE/ESA
```

for a list of versions for the member of the specified object type, or:

```
LIST NV/PV/LV/LMV/VV/MV LIBRARY(MEMBER)
LIST VV LIBRARY.SUBLIBRARY(MEMBER.MEMBER-TYPE) /* for VSE/ESA
```

for a list of versions for the member of the specified object type, or:

```
LIST MV
```

for a list of all members of all object types for which there are previous versions, or:

```
BROWSE NV/PV/LV/LMV/VV LIBRARY(MEMBER)
BROWSE VV LIBRARY.SUBLIBRARY(MEMBER.MEMBER-TYPE) /* for VSE/ESA
```

to display a version of the member. A window opens with the object parameters of the last version. You can modify any parameter, for example the date/time parameter to see an earlier version.

Note:

Versioning of LMS elements is described in detail in the subsection LMS Library Elements in Section BS2000/OSD Objects. Versioning of CA-LIBRARIAN members is described in the subsection Previous Versions in Section CA-LIBRARIAN Members.

Example 1: Listing previous versions of a PDS member

The following screen lists previous versions of a PDS member obtained using the command:

```
LIST PV FHI.JCL(COPYNSPF)
```

```
LIST-PV:FHI.JCL(COPYNSPF) ----- Row 0 of 2 - Columns 008 076
COMMAND==>                                SCROLL==> CSR
VV.MM      MODIFIED TIME      SIZE  ID      CHANGE REASON
** ***** top of list *****
    01.07      19980603 10:07      27 FHI
    01.06      19980603 09:55      27 FHI
** ***** bottom of list *****
```

The lists for previous versions of VSE/ESA members has the same format (for an example, see below).

Meaning of column headings:

Column	Meaning
VV.MM	Version and modification level. If a version is in HOLD status, this field is highlighted.
MODIFIED	Date of modification.
TIME	Time of modification.
SIZE	Number of lines.
ID	User ID of user who saved this version.
CHANGE REASON	Brief indication for reason of the modification from one version to the next (see the subsection Reason for Change).

You can select any version with the B (BROWSE), CH (CHANGE), D (DELETE), DI (DIFFERENCE), or HL (HOLD) line command. These functions are described in a separate subsection below.

Example 2: Listing previous versions of a Natural member

The following screen illustrates a list of previous versions of a Natural member obtained using the command:

```
LIST NV MYLIB(MYPROG)
```

```
LIST-NV:MYLIB(MYPROG) ----- Row 0 of 3 - Columns 011 076
COMMAND====>                                SCROLL====> CSR
NUM VV.MM          MODIFIED TIME      ID      CHANGE REASON
** ***** top of list *****
   0 01.02          19980722 15:07:30 FHI
  -1 01.01          19980722 15:07:05 FHI
  -2 01.00          19941124 18:58:59 MZC
** ***** bottom of list *****
```

Meaning of column headings:

Column	Meaning
NUM	Version number: zero (0) indicates the most recent version.
VV.MM	Version and modification level. If a version is in HOLD status, this field is highlighted.
MODIFIED	Date of modification.
TIME	Time of modification.
ID	User ID of user who saved this version.
CHANGE REASON	Brief indication for reason of the modification from one version to the next (see the subsection Reason for Change).

You can select any version with the B (BROWSE), CH (CHANGE), D (DELETE), DI (DIFFERENCE), or HL (HOLD) line command. These functions are described in a separate subsection below.

Example 3: Listing previous versions of a VSE/ESA member

The following screen illustrates a list of previous versions of a VSE/ESA member obtained using the command:

```
LIST VV NATPROC.IV131.SYSTEM.LIBRARY.TEST1(UEDTB1)
```

Where TEST1 is the name of the sublibrary that contains versions of member UEDTB1.

```
LIST-VV:NATPROC.IV131.SYSTEM.LIBRARY.TEST1(UEDTB1. Row 0 of 4 - Columns 008 076
COMMAND==>                                SCROLL==> CSR
      VV.MM          MODIFIED TIME      SIZE  ID      CHANGE REASON
** ***** top of list *****
      01.03          19980827 13:49:41    32 MBE      release version
      01.02          19980827 13:47:10    32 MBE
      01.01          19980827 13:45:41    32 MBE
      01.00          19980827 13:41:02    32
** ***** bottom of list *****
```

Meaning of column headings:

Column	Meaning
VV.MM	Version and modification level. If a version is in HOLD status, this field is highlighted.
MODIFIED	Date of modification.
TIME	Time of modification.
SIZE	Number of lines.
ID	User ID of user who saved this version.
CHANGE REASON	Brief indication for reason of the modification from one version to the next (see the subsection Reason for Change).

You can select any version with the B (BROWSE), CH (CHANGE), D (DELETE), DI (DIFFERENCE), or HL (HOLD) line command. These functions are described in a separate subsection below.

Available Functions for Previous Versions

Relevant for object types NV, PV, VV and MV

The functions available for previous versions are BROWSE, CHANGE, COMPRESS DELETE, DIFFERENCE and HOLD. All commands except COMPRESS can be executed as line commands from lists of previous versions or as function commands with appropriate parameters from any Natural screen.

The following table provides an overview of these functions. More detailed information and examples follow.

Function	Line Command	Meaning
BROWSE	B	Display specified version (no modification possible).
COMPRESS	-	Reorganize versions of a member and thus compress versions file.
CHANGE	CH	Add/modify change reason of a specified version.
DELETE	D	Delete specified version.
DIFFERENCE	DI	Display difference between current version and specified version.
HOLD	HL	Hold current version, thus preventing it from being automatically deleted.

BROWSE

You can select a previous version from a list of versions with the **B** line command, or you can issue the BROWSE function command from any system screen.

Example:

For example, the command:

```
BROWSE PV MY.OWN.LIB(MEM)
```

requests a display of a previous version of PDS member MEM in the library MY.OWN.LIB. The command opens a prompt window in which you can specify which version you require by date and/or time:

```
+-----+
! BROWSE-PDSVER:                               !
! Dataset Name  ===> MY.OWN.LIB                 !
! Member       ===> MEM                       !
! Date         ===> 93/08/02-11:30             !
! Volume       ===>                             !
! Password     ===>                             !
! Node        ===> 148                         !
+-----+
```

The current data and time is the default, meaning the current (or latest) version is selected. If you do specify the exact date or time, the version closest to the specification is selected:

```
BROWSE-PV:MY.OWN.LIB(MEM)-V01.03-93/07/29-11:14 ----- Columns 001 072
COMMAND===>                                           SCROLL===> CSR
***** ***** top of data *****
000001 This is the third version of a PDS member.
000002 This is the third version of a PDS member.
000003 This is the third version of a PDS member.
***** ***** bottom of data*****
```

Note that the header line gives an indication as to the version number and modification level, as well as the date and time the version was created.

CHANGE

The CHANGE command is available for any previous version of a member. It is available as the line command CH only. The CHANGE command allows you to add/modify the CHANGE REASON of a version. A window opens in which you can modify/enter the change reason:

```

LIST-NV:MYLIB(MYPROG) ----- Row 0 of 3 - Columns 011 076
COMMAND===>                                SCROLL===> CSR
NUM +-----+
** *** !                                     !
    0 ! Enter reason for change: _____ !
ch  -1 !                                     !
    -2 +-----+
** ***** bottom of list *****

```

DELETE

You can delete any version of an object by selecting it with the **D** line command from a list of previous versions, or by issuing the DELETE function command with the appropriate object type and object parameters.

Example:

For example, the command:

```
DELETE PV MY.OWN.LIB(MEM)
```

Opens a prompt window similar to the one described for BROWSE above, and you can select the version to be deleted by specifying the version date and/or time.

If you delete the current version of an object, the previous version becomes the current version. When the object is listed (for example, LIST PDS), the modification date and time are refreshed to the date and time of the previous version. In lists of Natural members (LIST NAT), however, the DATE and TIME fields of the 'new' current version reflect the date and time of the delete operation.

A Note on Storage:

Storage occupied by previous versions is only freed after a DELETE operation if the oldest or most recent versions are deleted. If you delete any other versions, storage is not released until a compression of the related member(s) is performed. It is therefore recommended that you inform your Administrator after you have deleted a considerable number of versions.

DIFFERENCE

The DIFFERENCE function is available for any previous version of a versioned object. It displays the current version together with any changes made during the period between the selected version and current version. Changes are indicated by highlighting and a corresponding remark in the prefix area.

Example:

The following figure illustrates the result of the DIFFERENCE command on a previous version of Natural member MYPROG in library MBE:

```

DIFFERENCE-NV:MBE(MYPROG)-Ver<-2>-93/08/02-16:31:08 ----- Columns 011 076
COMMAND===>                                SCROLL===> CSR
** ***** top of list *****
    000010 * NSPF - GET MODEL VARIABLES ( CALLNAT TO ISP--MVN )
Old>0010 * NSPF - GET MODEL VARUABLES ( CALLNAT TO ISP--RVN )
    000020 DEFINE DATA
    000030 GLOBAL USING ISP---GL
Old>0030 GLOBAL USING ISP----G
    000040 LOCAL
    000050 1 #REQUEST(A8)
    000060 1 #RETURN(A8)
New>0070 1 #NEWFIELD(A8)
    000080 END-DEFINE
    000090 MOVE ##NAT-REQUEST TO #REQUEST
    000100 CALLNAT 'ISP--MVN' #REQUEST #RETURN ##ISPF-ERC ##ISPF-ERT ##SES-DA
Old>0100 CALLNAT 'ISP--RVN' #REQUEST #RETURN ##ISPF-ERC ##ISPF-ERT ##SES-DA
    000110 ##ED-SESNUM(0)
    000120 MOVE #RETURN TO ##TEMP-A20
Del>---- END-SUBROUTINE
    000130 END
** ***** bottom of list*****

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Split End  Suspe Rfind Rchan Up      Down Swap Left Right :s

```

- The lines with no remark in the prefix area are those of the current version.
- The highlighted lines with Old in the prefix area indicate the lines which have been changed. The modified line in the current version is directly above the Old line.
- The highlighted lines with Del in the prefix area indicate the lines that have been deleted and no longer exist in the current version.
- The lines with the highlighted prefix and the remark New did not exist in the earlier version and have been added in the current version.

HOLD

The HOLD command is available for the current version of an object. Placing a member in HOLD status means that it is not counted as an existing version and is not automatically deleted as further versions of the member are created.

Example: Set version number to n

The HOLD command accepts a function parameter VV=n in order to set the version number to *n* instead of incrementing it by 1.

```
HOLD N MBE(MYPROG), VV=7
```

sets the version number to 7 if the current version is less than seven.

As a result of the HOLD command, the version number (VV value) is increased by 1 or set to the value passed as VV parameter, and the modification level (MM value) is set to 00. Further HOLD operations on the member further increase the version number.

Example: Issue HOLD for current version (with prompting)

The HOLD command can be issued for the current version as line command from a list of versions, or from any system screen as function command. For example, the command

```
HOLD NV MBE(MYPROG)
```

opens the following prompt window:

```
+-----+
! HOLD-NATVER:                               !
! Library      ==> MBE                        !
! Member       ==> MYPROG                     !
! Date         ==> 93/08/03-11:53             !
+-----+
```

Only the current version is selected. Press Enter to confirm.

Example: Issue HOLD for current version (without prompting)

The command

```
HOLD N MBE(MYPROG)
```

holds the current version of Natural member MYPROG without prompting.

Reason for Change

When updating a member with versioning active, you can indicate a reason for changing the member in either of the following ways. In either case, the reason given appears in the field headed CHANGE REASON in the list of versions for the member (see the examples of lists of versions above).

1. When saving the new version of the member, add the reason as parameter to the SAVE or STOW command, for example:

```
STOW 'Referenced program names changed'
```

2. If the library is in the list of versioned libraries, ask your system administrator to add the string REASON to the library name. Every time you then issue the SAVE or STOW command, a window opens prompting you to add the reason for the change.

If you are authorized to change the CHANGE REASON, you can also use the CH line command.

Editing and Saving Previous Versions

Earlier versions of a member are available in BROWSE mode only (no modifications possible, see the description of the BROWSE command above). When displaying an earlier version of a member in Editor format, you can use the Editor CREATE command to save the version under a different name in the object library.

You must mark the first and last lines of the block in the member you wish to save with the Editor line command CC and enter the command:

```
CREATE newname
```

in the command line. Press Enter to create a new member with the specified name. You can edit and maintain the new member as any other member.

Alternatively, you can use multi-session mode to copy all or part of an earlier version into a new or existing member using the Editor CC line command to mark the block to be copied, and the Editor A, B or O line commands in the target member to mark the place where the text is to be entered.

Another alternative is to delete all versions created after the version you want to reactivate. This automatically makes the required version the current version.

Note:

If you update a versioned Natural, PDS or VSE/ESA member with an editor outside of Natural, all versioning data for the member is lost.